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### DIOPHANTINE ANALYSIS.

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109. Proposed by HARRY S. VANDIVER, Bala, Pa.

If  $m+n+1$  is a prime integer, show that  $m! \times n! - (-1)^{\frac{1}{2}(3m-n)}$  is divisible by  $m+n+1$ . For instance,  $6! \times 4! - (-1)^7$  is divisible by 11.

110. Proposed by L. E. DICKSON, Ph. D., The University of Chicago.

Prove the results stated in the foot-note at the end of §4 in the article by L. E. Dickson in the October number of the MONTHLY.

111. Proposed by HARRY S. VANDIVER, Bala, Pa.

Show that: If a rational, integral polynomial of the  $n$ th degree in  $x$ , becomes a prime for more than  $n$  values of  $x$ , then it cannot be resolved into rational factors. (Test with the expression  $x^4 + 2x^3 + x^2 + 2x + 1$ .)

### AVERAGE AND PROBABILITY.

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135. Proposed by L. C. WALKER, A. M., Graduate Student, Leland Stanford Jr. University, Cal.

If the line joining two points taken at random in the surface of a given circle be the diagonal of a square, the chance that the square lies wholly within the circle is  $2 - 4/\pi$ .

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### NOTES.

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Prof. Lon C. Walker is doing postgraduate work in Leland Stanford Jr. University. F.

Prof. Harry S. Vandiver is taking a course of mathematics in the University of Pennsylvania. F

On December 15, the University of Klausenberg will celebrate the hundredth anniversary of the birth of Johann Bolyai. F.

Dr. F. Schottky of Marburg has been named to succeed the late L. Fuchs as Professor in the University of Berlin. Dr. K. Hensel of Berlin has been named Professor in the University of Marburg. D.

Dr. Joseph Swain, President of the University of Indiana since 1893, and formerly Professor of Mathematics in Indiana and Stanford Universities, was installed as President of Swarthmore College on November 15. D.

In the reconstitution of the University of London, complete courses of study in the various faculties of the University College have been established.